

**UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF WISCONSIN**

REMBRANDT DATA STORAGE, LP,

Plaintiff,

vs.

SEAGATE TECHNOLOGY LLC,

Defendant.

Civil No. 10-693

DECLARATION OF JOHN BEST, PH.D.

I, John Best, hereby declare as follows:

1. I have been retained by defendant Seagate Technology as an expert witness to provide my opinions on several claim construction issues relating to the invention claimed in U.S. Patent Nos. 5,995,342 (the '342 patent) and 6,195,232 (the '232 patent). In particular, I have been asked to respond to statements on claim construction made by Roger F. Hoyt, Ph.D. in his declaration dated July 15, 2011, which was submitted by Rembrandt Data Storage.

EDUCATIONAL BACKGROUND AND EXPERIENCE

2. My expertise is in the field of data storage technology, including the design and manufacture of thin-film heads for data storage devices. I have worked in this field for more than 30 years, including working as a researcher, manager, and executive for IBM and later for Hitachi Global Storage Technologies.

3. I received my B.S. in Physics in 1975 and my Ph.D. in Applied Physics in 1979, both from the California Institute of Technology. I joined IBM in 1979 as a researcher working on data storage technology, and shortly after that worked specifically on thin-film heads and perpendicular recording. I subsequently worked as a manager, director, and vice president in the IBM Research Division; and as a vice president and ultimately Chief Technologist for the IBM Storage Technology Division. In these roles, I was involved in all aspects of hard disc drive technology, including extensive work with thin-film read and write heads. After IBM's hard disc drive storage business was purchased by Hitachi Global Storage Technologies in 2003, I continued as Chief Technologist for Hitachi Global Storage Technologies until my retirement in 2008. Since that time, I have worked as a consultant in the field of data storage. A copy of my CV is attached as Exhibit A.

OPINIONS ON CLAIM CONSTRUCTION ISSUES

4. For convenience, I have provided my opinions relating to various claim construction issues in the same order as they have been addressed by Dr. Hoyt in his declaration.

Level of Ordinary Skill in the Art

5. I understand that the person of ordinary skill in the art relating to an invention claimed in a patent is a fictitious person presumed to have the typical level of skill of practitioners in the field as of the effective filing date of the patent application, which I understand Rembrandt contends to be August 24, 1995 for both the '342 and '232 patents. I understand that many factors are considered in defining a hypothetical person of ordinary skill in the art, including: (1) the types of problems encountered in the art; (2) the prior art solutions to those problems; (3) the rapidity with which innovations are made; (4) the sophistication of the technology; and (5) the educational level of active workers in the field.

6. I agree with Dr. Hoyt that the subject matter claimed by the patents-in-suit generally relates to the design of thin-film magnetic recording heads for data storage devices, particularly hard disk drives ("HDDs"). Based on my experience working in this field, a person of ordinary skill in the art as of August 1995 typically would have had an advanced degree—such as a Ph.D.—in physics, electrical engineering, materials science, or physical chemistry, including research or development experience with thin-film magnetic recording heads, either in industry or academia. If the person did not have an advanced degree, they would have had more extensive academic or industry experience.

The engineers and researchers I worked with or supervised at IBM were skilled persons, as were others in the research and product development departments for recording heads at companies such as Read-Rite, Seagate, Headway, TDK, Hitachi, and Alps.

Technology Overview/Historical Development

7. I have reviewed the technology and historical background sections contained in the claim construction briefs submitted in this case by Seagate and by Rembrandt, as well as in the declaration provided by Dr. Hoyt. In general, I do not believe there are significant differences in the descriptions of the technologies in these submissions. To the extent there are differences, I believe that the technology descriptions provided by Seagate are more accurate. In addition, I do not agree with all of Dr. Hoyt's descriptions of the historical developments relating to write heads and read heads for HDDs. However, I do not believe these differences are significant for the claim construction issues that I understand are under consideration by the Court. I mention several of these differences here for accuracy, but reserve my right to address other issues later if asked to do so.

8. In his declaration, Dr. Hoyt suggests that “[t]he read/write head is the key component” of an HDD that determines overall performance. (Hoyt Decl. ¶ 9.) Although I agree with Dr. Hoyt that read and write heads are important components that contribute to the overall performance of HDDs, they are not the only important components. Other components, including the media, electronics, actuators, motors and other components also contribute significantly to overall HDD performance and areal densities (the amount of data that can be stored in a given space on the disk).

9. Dr. Hoyt states that, up until the 1990s, a single element was used in HDDs for both reading and writing data. (Hoyt Decl. ¶ 11.) I agree that this is generally true, although recording head devices with separate read and write elements for HDDs were known since the 1970s. (*See, e.g.*, Exhibit B (U.S. Patent No. 3,908,194).) To the extent Dr. Hoyt suggests that it was the patents-in-suit that enabled the combination of write elements with magnetoresistive read elements (Hoyt Decl. ¶ 27), I disagree.

10. I agree with Dr. Hoyt that the HDD industry migrated from longitudinal recording designs to perpendicular recording designs in their commercial products beginning around the 2004 to 2005 time period. Perpendicular recording allowed for a higher density of magnetic domains on the surface of the disk and thereby permitted more data to be stored. As a result of this basic change, HDD manufacturers redesigned their write heads to accommodate the special requirements associated with perpendicular recording. I note that Dr. Hoyt does not suggest that the patents-in-suit provided any novel contributions to these design changes. I agree. In my opinion, neither of the patents-in-suit discloses, teaches, or enables write-head designs optimized for perpendicular recording, but instead they disclose and focus on write elements for longitudinal recording.

11. I disagree with Dr. Hoyt to the extent that he suggests that at the time HDD companies moved to thin-film manufacturing, there were no known designs for a functional solenoidal coil for a thin-film write head that could be made with known manufacturing techniques. (Hoyt Decl. ¶ 21.) Just the opposite is true. Functional solenoidal coils for thin-film write heads have been known since at least the 1960s. (*See,*

e.g., Exhibit C (U.S. Patent No. 3,344,237).) In addition, functional solenoidal coils manufactured using thin-film technology are described in publications well before 1995. (*See, e.g.*, Exhibit D (D.D. Tang & L.T. Romankiw, *Omega Planar Head Structure with 120 Turns*, in Proceedings of the Third Int'l Symposium on Magnetic Materials, Processes, and Devices, 17-24 (L.T. Romankiw & D.A. Herman, Jr. eds., 1994))). Dr. Hoyt also overstates the advantages of solenoidal coils over pancake coils.

12. I also do not agree with all of Dr. Hoyt's descriptions of the prior art write heads or with his characterizations of the alleged improvements provided by the invention claimed in the '342 and '232 patents. For example, Dr. Hoyt states that certain features of the claimed invention of the patents are "novel" or "unique." (Hoyt Decl. ¶¶ 22-24). To the extent Dr. Hoyt is suggesting that these features were not known in the prior art to persons of ordinary skill in the art, I disagree. (*See, e.g.*, Exhibits E & F (Japanese Patent Application Publication No. 5-258238; Japanese Patent Application Publication No. H5-242432).)

13. Because I have not attempted to address all of the issues raised by Dr. Hoyt in his declaration, I reserve my right to address these issues in detail later in this case in connection with other opinions I may offer.

Claim Terms

Elongated

14. I disagree with Dr. Hoyt that the word "elongated" in the claims of the '342 and '232 patents would have been understood by a person of ordinary skill in the art in 1995 as a comparative term used to indicate that the back portion or region of the top and

bottom magnetic poles is longer than any other portion of the poles. (Hoyt Decl. ¶ 28.)

In my opinion, the word “elongated” is used in a straightforward way in the claims as an adjective to describe the shape of particular parts of the poles. In my opinion, the word “elongated” was understood by persons of ordinary skill in the art in 1995 in the same way it is today—something that has more length than width—and did not have any unique or specialized meaning in the field of thin-film recording head design.

15. I did not see anything in the specifications and prosecution histories of the two patents where the inventors tried to depart from the ordinary meaning of “elongated” and give it some unique or specialized meaning. If anything, the specifications use the word “elongated” in a manner that is consistent with its ordinary meaning. For example, the figures in the patents—Figure 1A in the ’342 patent and Figure 1 in the ’232 patent—both depict the portion of the pole that is described as “elongated.” These figures show that the “elongated” portion has more length than width. (*See, e.g.*, ’342 patent, 9:17-20; ’232 patent, 5:44-47.) In addition, when the patents use the word “elongated” in another part of the specification to describe the shape of the “conductor bars” (*see, e.g.*, ’342 patent, 12:19-22; ’232 patent, 8:39-42), the shape that is depicted in Figure 3(a) in both patents is consistent with the ordinary meaning of “elongated”—the bars are longer than they are wide. These examples suggest to me that a person of ordinary skill in the art would have understood that the word “elongated” was being used in the claims of the patents consistent with its ordinary meaning of something that has greater length than width.

16. Dr. Hoyt observes that the inventors stated in the specifications that the “elongated” portion should be sufficient to accommodate the coil turns and spacing, and suggests that this statement therefore must mean that the inventors intended to have some “elongated” portions around which the coils are wrapped to have less length than width. (Hoyt Decl. ¶ 28.) Dr. Hoyt apparently is suggesting that a pole with a single coil turn would not be very long, and that therefore the “elongated” portion of the pole around which it is wrapped would therefore not necessarily have more length than width. I disagree. First of all, Dr. Hoyt has not identified, and I have not seen, any embodiment described in the patents where the “elongated” portion of the pole actually has a length that is less than its width. Second, Dr. Hoyt seems to presume that a coil with a single turn would be narrow, and thus would allow for a pole that is not very long. But, in my opinion, a coil with a single turn would not necessarily be narrow at all. In fact, a person of ordinary skill in the art as of 1995 would have appreciated that a coil strip with a single turn would need to be wide in order to carry sufficient current to create a strong enough magnetic field to write to the disk, and therefore the portion around which it is wrapped would need to be long. In addition, a person of ordinary skill would understand from the specifications that there are other reasons why this portion should be longer than it is wide, particularly where the inventors emphasized that the width to length ratio should be less than one. (*See* '342 patent, 15:60-62.) In this regard, Dr. Hoyt also ignores the fact that if the length of a pole is reduced, the patents suggest that the width of the pole should also be reduced, which, as stated in the patent, has the advantage of reducing inductance. (*See* '342 patent, 25:60-62 (“The shorter (and narrower) pole dimensions offer the further

advantage of reduced device inductance.”); *see also* ’342 patent, 15:54-62 (explaining optimization of width of pole).) Therefore, in my opinion, there is not anything in the patents that would have suggested to a person of ordinary skill that the word “elongated” should be understood in a way that is inconsistent with its ordinary meaning of something that has more length than width.

Back-Closure Region/Back-Closure Contact Area

17. Dr. Hoyt does not explicitly address in his declaration how a person of ordinary skill in the art in 1995 would have understood the meaning of the claimed “back-closure region” and “back-closure contact area” in the two patents. In my opinion, a person of ordinary skill reading the specifications and prosecution histories of the two patents would have understood the “back-closure region” and “back-closure contact area” (the area within the back-closure region where contact occurs) to have very special characteristics. In particular, the inventors took great pains to distinguish what they claimed was an improvement over the prior art write head designs. The inventors emphasized in the specifications that the back-closure region was designed so that the top and bottom magnetic poles are in intimate physical contact with one another and have no intervening or connecting vias. In other words, in the back-closure region they were claiming, the poles are directly in contact with one another and have no intervening or connecting structures between the poles. For example, in the specifications for the patents, the inventors heavily criticize the prior art write head designs because they had magnetic poles connected using vias. The inventors state that using a via to connect the poles causes problems because a via “restricts magnetic flux” and causes “a full or partial

saturation (during write operations),” thereby “impairing the device efficiency and overwrite capability.” (’342 patent, 2:24-29; ’232 patent, 2:20-25.) The inventors go on to state that another problem with vias is that they have “multiple domains in various orientations” that “increase the device susceptibility to magnetic noise.” (’342 patent, 2:29-34; ’232 patent, 2:25-30.)

18. After the inventors criticize prior art write heads with vias, they then go on to describe how their back-closure region is an alleged improvement over the prior art because it does *not* use vias. For example, they state in the first sentence of the “Summary of the Invention,” that “[a]ccording to the present invention, the TFH device’s magnetic noise is significantly reduced.” The inventors explain that “[i]n order to minimize the device noise, the ideal magnetic core should have a gradual, smooth toroidal (or a horse-shoe) shape with *no vias*, loose ends, nooks, crevices, or sharp corners.” (’342 patent, 4:3-8, 4:10-13; ’232 patent, 3:24-29, 3:31-34) (emphasis added).) In other words, rather than having any intervening connection between the poles, the inventors describe having a direct connection, with no via through a gap or insulating layer between the two poles in their back-closure region. This point is further emphasized, for example, in claim 18 of the ’232 patent, where the claim adds an insulating layer but also requires that there can be “no via in said insulation layer.” Based on these statements and teachings, it seems clear to me that persons of ordinary skill in the art in 1995 would have understood the back-closure region to exclude the use of vias.

19. I also note from my review of the prosecution histories of the patents that the inventors repeatedly characterized their invention to the Patent Office as one that did not have vias in the back-closure region. The inventors stated in their submissions to the Patent Office that their invention had “no vias” in the back-closure region and that the invention was “via-free.” (*See* Litsey Decl., Ex. M at 264 ('232 Patent Office Action Response, Dec. 30, 1999 at 19).) Therefore, in my opinion, a person of ordinary skill in the art would have unmistakably understood these terms to exclude any sort of via.

20. In his declaration, Dr. Hoyt suggests that the “planar” write-head design with “pillars” that is described as an alternative to the planar design shown in Figure 4(b) of the '342 patent is somehow related to understanding the “back-closure region” claimed in the patents. (Hoyt Decl. ¶ 29-30.) I do not see the relevance of this alternative design to the claim construction issue. In fact, if anything, when discussing this alternative design in the specification, the inventors carefully distinguish between a design that has magnetic closures “formed in the same or a similar manner” as the “back-closure region” and one that has “magnetic core pillars.” ('342 patent, 23:44-52.) This statement clearly suggests that a “magnetic core pillar” is something different than the “back-closure region” claimed by the patents. Furthermore, I do not understand the planar designs discussed in the '342 patent even to be covered by the claims. For example, the claims of the '342 patent include the requirement that the write element have top and bottom pole tips. But there are no bottom pole tips shown in the planar designs of Figure 4(a)-(b), so they cannot be covered by the claims. The planar embodiments similarly lack a “non-magnetic gap layer formed over” the “bottom pole-tip portion.” Instead, the planar

embodiments have “two top magnetic pole-piece segments,” where each top pole-piece segment has a “pole tip,” and where the non-magnetic gap layer is formed between the two top pole tips. (*See* ’342 patent, 22:48-61 & Fig. 4(a)-(b).) Accordingly, I do not believe Dr. Hoyt’s observation is helpful or relevant to the claim construction issue here.

21. I also note that Dr. Hoyt makes a statement about the material properties of Seagate’s accused write head designs. (Hoyt Decl. ¶ 30.) Dr. Hoyt does not describe how his observation about Seagate’s HDDs relates to any claim construction issue. In particular, whether Seagate’s write heads have or do not have vias (in fact, they do have vias) does not seem relevant to how a person of ordinary skill in the art in 1995 would have understood the characteristics of the back-closure region claimed in the patents.

Along the Sides

22. I understand that the Court has concluded that it will not construe the phrase “along the sides” at this time. Therefore, I will not address Dr. Hoyt’s comments on this claim term here other than to note that, in my opinion, the phrase did not have any unique or specialized meaning in the field of thin-film heads to a person of ordinary skill in the art.

Contact Pads

23. Dr. Hoyt suggests that a person of ordinary skill in the art reading the patents would have understood the phrase “contact pads” to necessarily mean “enlarged” contact pads. (Hoyt Decl. ¶ 33.) I agree that a person of ordinary skill in the art in 1995 would have understood that the contact pads claimed in the ’232 patent could have larger dimensions than other parts of the conductor strips to which they are connected and that

there might have been good technical reasons for making them larger, especially if the strips could be staggered. But I don't believe it follows that a person of ordinary skill therefore would have understood that the contact pads claimed in the patents must be enlarged. In addition, Dr. Hoyt does not point to any part of the specification or the prosecution histories that state that the contact pads must be enlarged (unlike the unmistakable statements saying that the invention does not have vias in the back-closure region).

Top/Bottom Magnetic Poles

24. I disagree with Dr. Hoyt that a person of ordinary skill in the art in 1995 would have understood the words "top" and "bottom" when used with magnetic poles to mean "the upper and lower of a pair of poles." (Hoyt Decl. ¶ 35.) In my opinion, the words "top" and "bottom" did not have any specialized meaning to persons of ordinary skill in the art in the field of thin-film recording heads in 1995, nor do they today. In addition, I did not see anything in the specifications or prosecution histories of the two patents that suggests or shows that the inventors intended for these words to have some unique or specialized meaning. In my experience, these words were used by persons of ordinary skill in the art in 1995 in the same way everyone else used them.

25. Dr. Hoyt does not explain how his point that write elements may have two or more poles is helpful to an understanding of the meaning of "top" and "bottom" as used in the patents. (Hoyt Decl. ¶¶ 35-36.) It is true that a write element may have more than two poles, and such designs were known before 1995. But I do not understand how the number of poles in a write element is relevant to an understanding of the meaning of

“top” and “bottom” as applied to a series of poles. In my opinion, these are words that would have been used and understood by persons of ordinary skill in the art in accordance with their plain and ordinary meaning.

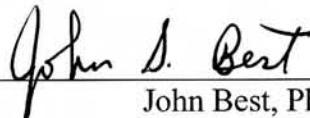
Thin Film Head Device

26. I believe Dr. Hoyt is mistaken when he characterizes the dispute over the interpretation of the phrase “thin film head device” in the ’342 and ’232 patents as a debate over whether the device as a whole should be limited to a “toroidal” shape or just the write element. (Hoyt Decl. ¶ 37.) I agree with Dr. Hoyt that the word “toroidal” as used in the ’342 and ’232 patents refers to the write element, and not the recording head as a whole. Similarly, I agree with Dr. Hoyt that “[a] person of ordinary skill in the art would not read [claim 1 of the ’342 patent] to mean that the write element has to be magnetoresistive or that the read element has to be toroidal.” (*Id.*) My understanding is that the dispute is over whether claim 36 of the ’342 patent and claim 1 of the ’232 patent relate only to “toroidal” shaped thin-film write elements or whether they may have other shapes. In my opinion, a person of ordinary skill in the art, looking at the patents as a whole, would clearly understand the patents to relate to “toroidal” thin-film write elements because the inventors unmistakably describe the write element in that way. The patents repeatedly describe the overall invention as “toroidal,” and all of the embodiments that are claimed in the patents have toroidal write elements. In addition, the inventors list objectives for the invention in which every single objective identifies a “toroidal” thin-film recording head. Under these circumstances, I believe a person of ordinary skill in the art would have understood the invention claimed in both patents to

include a toroidal write element. To the extent the inventors intended to claim other designs that are not toroidal, I have not seen any written description of them in the patents.

I declare under penalty of perjury under the laws of the United States that the foregoing statements are true and correct.

Executed on August 4, 2011.
San Jose, California


John Best, Ph.D.